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NORTHEAST MINNESOTA TRENDS AND OPTIONS

Wilbur R. Maki

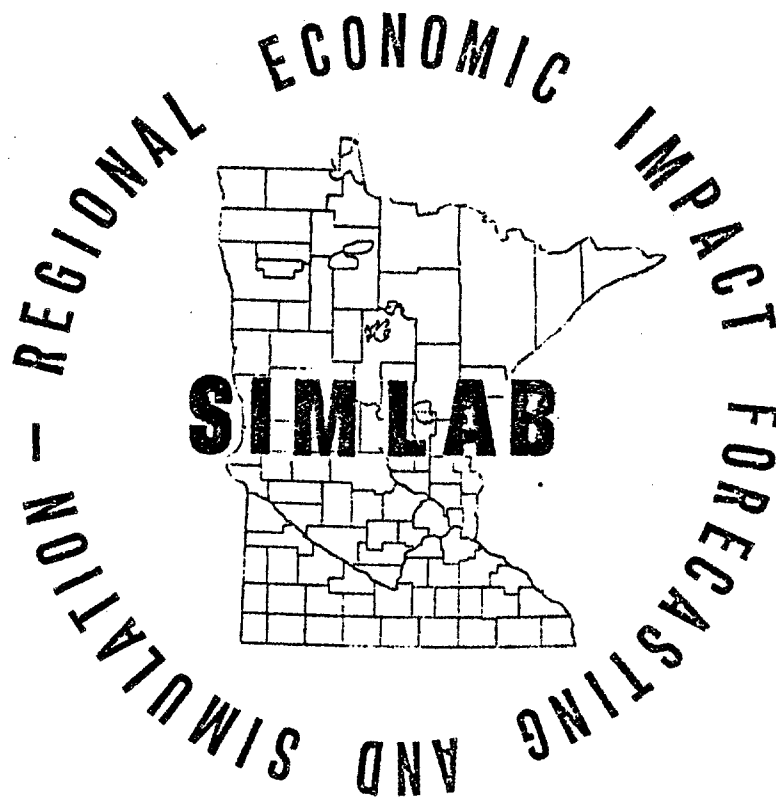


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Abstract

Existing statistical series on Northeast Minnesota economy are used in establishing a factual base for assessing regional economic trends and options. Population, labor force, and industry employment are presented in two contrasting options for Northeast Minnesota, namely, a baseline option and a differential option. In the baseline option, the Northeast Minnesota economy tracks the U.S. economy while in the differential option, current demographic and economic trends are extended to 1985 and 1990. The latter option portrays a rapidly declining regional economy as a consequence of reduced levels of exports in the region's basic industries, particularly taconite mining and manufacturing.

NORTHEAST MINNESOTA TRENDS AND OPTIONS

Wilbur R. Maki

My focus today is the economic future of Duluth and its region -- Northeast Minnesota. The four horesmen of regional economic growth -- people, jobs, income, and investment -- ride together. When people leave, jobs, income, and investment follow. When investment occurs in new businesses, however, and new jobs are created to increase the production of goods and services for export to regional and national markets, the regional economy expands and prospers. Even former residents return to seek the new jobs. Both patterns of economic change have characterized the Northeast Minnesota economy in recent years.

People, Jobs, Income, and Investment

People and their skills and capacities for working together productively in business and community enterprise is an important asset in regional growth and development. Over 343 thousand people live in the seven counties of Northeast Minnesota, of which 93 thousand reside in Duluth. They form a resident labor force of 147 thousand. In 1980, 132 thousand were employed. Because of severe reductions in taconite mining and other cyclically-sensitive industries in the region this total has declined sharply.

The 1980 U.S. Census of Population shows, for Northeast Minnesota, a population generally older than in Minnesota as a whole and also a population with fewer people in the remuneratively productive age classes, especially between 25 and 45 years of age.

Current population levels are the outcome of population migration and natural increase, that is, births minus deaths. Typically, young people move out while older people move into the region. The net movement depends, in large part, on jobs and income-earning opportunities in the region. Lack of new job openings locally, together with low retirement rates in existing jobs, high unemployment rates, and many new job openings elsewhere in the nation quickly trigger net out-migration, particularly in the age classes from 25 to 45 years.

A second important variable in regional growth and change is labor force participation. The rate of labor force participation is the proportion of the total population in each age and gender class which is in the labor force, that is, working or seeking work. In Northeast Minnesota, labor force participation rates are lower than in Minnesota as a whole largely because of the low participation rates of females in all age classes.

A third important variable is the occupational distribution of the regional work force. In 1980, a relatively large portion -- 34 percent -- of the Northeast Minnesota work force was included in (1) maintenance and construction and (2) craft and repair. In comparison, only 27 percent of the Minnesota work force was reported in these two occupations. Thus, the regional labor force is oriented to a materials-producing economy, which also accounts for the low proportion of female workers.

The three critical demographic variables in regional growth and change -- migration, labor force participation, and occupational distribution -- reveal much about the economic past of Northeast Minnesota. They are related to various household characteristics, including size, income, and residence. Because of proportionately more older single-person

households, the average household is only slightly larger in Northeast Minnesota than in Minnesota generally. A large proportion of households are in the low and, also, moderately high, income classes. The once large household is declining in average size.

Finally, a snapshot of Northeast Minnesota population and its distribution shows concentration in two urban modes -- Duluth and the agglomeration of 23 municipalities centered on the Mesabi Iron Range. A total of 198 thousand persons reside in urban areas, with slightly more than 102 thousand in the urbanized portions and another 95 thousand persons in urban fringe areas. A rural population of 146 thousand also is included.

Municipal and county population trends show a reversal in the 1970's, with a majority of places increasing in total population. Most recent trends and projections show still another reversal in the mid-1980's which is, in part, a response to high unemployment levels throughout the region.

Private and Public Entrepreneurship

Export expansion and import substitution are two strategies for private and public entrepreneurship. They focus directly on two dimensions of economic growth and change -- export markets and the economic base multiplier. Export markets are represented by all non-resident purchases of goods and services produced in Northeast Minnesota. Thus, shipments to manufacturing plants in the Minneapolis-St. Paul Metropolitan Area, as well as visitor purchases of recreation-related services, are included among non-resident purchases.

Exports are linked to local employment through the economic base multiplier, the statistical relationship between total employment and

export-producing employment. Its magnitude is inversely related to the level of industry, household, and government purchases from rest-of-nation industries, that is, imports. Thus, the smaller the purchases of imports, the larger the economic base multiplier.

Import substitution reduces the import dependency of local industries. Export expansion may generally increase total imports and thus import dependency. Neither strategy insures a region's economic prosperity and long-term viability. Rather, the region's industry composition and the input requirements and value added contribution of each industry are dominant considerations in the choice of development strategy.

Industry composition in Northeast Minnesota is represented by the level of individual industry employment, output, and value added. A recent historical period is selected for presenting the statistical indicators of industry composition, namely, 1977. Because of data availability, comparisons can be made between Northeast Minnesota and Minnesota industry composition for the same year. For these comparisons, industry output and employment are shown for 10 industry groups in Table 1.1

Also shown are the employment requirements of Northeast Minnesota industry activity. For example, a total of 108.4 thousand jobs were created in producing an aggregate industry output valued at more than \$5.5 billion in 1977. A total of 28.7 thousand jobs produced out-of-region shipments valued at more than \$2.2 billion while the in-shipments, which were valued at slightly more than \$2 billion, were produced by 35.6 thousand jobs outside the region.

Jobs created in the region in the production of goods and services for local and external markets is one measure of economic performance.

Table 1.1. Gross output, value added, regional requirements, export, and employment in specified industry, Northeast Minnesota, 1977.

Industry No.	Title	Product Value					Employment					
		Gross Output	Ex- ports	Im- ports ^{1/}	Requirements ^{2/}	Im- ports ^{3/}	Value Added	Total	Ex- ports	Im- ports	Resi- dentiary	Net
		(mil. \$)	(mil. \$)	(mil. \$)	(mil. \$)	(mil. \$)	(mil. \$)	(thou.)	(thou.)	(thou.)	(thou.)	(thou.)
1.	Agriculture For. Fish	53	10	191	244	18	18	4.3	0	6.3	4.3	10.6
2.	Mining	910	894	149	165	199	367	10.5	10.5	0.4	4/	0.4
3.	Construction	616	127	20	509	173	272	6.8	0.2	0.3	6.6	6.9
4.	Mfg., Nondurables	1321	780	455	996	474	344	9.7	6.9	5.8	2.8	8.6
5.	Mfg., Durables	481	125	671	1027	125	188	7.2	2.4	10.8	4.8	15.5
6.	Tran., Com., Util.	481	121	122	482	77	263	9.0	2.7	2.5	6.3	8.8
7.	Wholesale Trade	191	0	68	259	15	142	5.5	0	2.1	5.5	4.3
8.	Retail Trade	432	82	0	350	49	292	19.8	1.8	0	18.1	18.1
9.	Fin., Ins., Real Est.	651	14	296	933	61	464	4.6	1.4	5.7	3.2	8.9
10.	Services	315	51	43	307	60	196	29.5	2.9	1.7	26.6	28.3
11.	Government ^{5/}	61	0	1	62	9	32	1.7	0	0	1.7	1.7
12.	Sub-Total	5512	2219	2016	5309	1223	2583	108.4	28.7	35.6	79.7	115.3

^{1/} Imports from specified (row) industry in rest-of-nation.^{2/} Region requirements of specified (row) industry output, i.e., gross output-exports and imports.^{3/} Import purchases of specified (column) industry in region.^{4/} 50 or less.^{5/} Government enterprise and scrap.

Jobs are created outside the region, too, because of the demand for products in the region. The total jobs created by the Northeast Minnesota market is the sum of the jobs created outside the region and within the region. In 1977, this total was 115.3 thousand, of which 35.6 thousand was attributed to jobs created by the imports of goods of services by Northeast Minnesota residents -- household, business, and government.

The net jobs created by private sector purchases of goods and services in Northeast Minnesota was 6.9 thousand greater than the jobs created directly by its production of goods and services. This difference represents the excess of jobs created outside the region by imports over jobs created within the region by exports. Thus, the Northeast Minnesota private economy achieves the consequences of a high value added and a high earnings per worker economy in fewer, but higher paying, jobs. The excess jobs created outside the region in 1977 was due to a combination of high regional purchasing power coupled with lack of strong competitive advantages in import substitution. Generally, earnings per worker among the 35.6 thousand import-producing jobs were significantly lower than in the 28.7 thousand export-producing jobs. All of these jobs, including the residentiary jobs, were in the private sector.

Government jobs in 1977 totaled 25.9 thousand, of which the civilian portion was residentiary and the military's was export-producing. The total jobs and their market orientation was as follows:

<u>Sector</u>	<u>Total</u>	<u>Export</u>	<u>Import</u>	<u>Residentiary</u>	<u>Net</u>
Private	110.5	28.7	35.6	81.8	117.4
Government	<u>25.9</u>	<u>3.0</u>	<u>0</u>	<u>22.9</u>	<u>22.9</u>
All Industry	136.4	31.7	35.6	104.7	140.3

Thus, when all military jobs are viewed as export-producing (because of federal income payments originating outside the region), the export-import job deficit is reduced from 6.9 thousand to 3.9 thousand. If all federal civilian jobs were export-producing, then the export-import job deficit is reduced to 2.3 thousand. Finally, if all federal and state jobs, which includes University of Minnesota-Duluth employees, were viewed as export-producing, the export-import job deficit would be wiped out. Of course, with full employment in the mining industry, which operated with reduced employment in 1977 because of a prolonged strike, export-producing employment would have increased by more than 3 thousand. With higher levels of employment in iron mining, import-producing jobs would also increase outside the region, which would reduce the net increase to near its original level.

A second measure of regional economic performance is the purchasing power of its resident economic units represented by its final produce value. In 1977, the final purchases of its household, business, and governmental units were as follows:

<u>Regional Product</u>	<u>Total Value</u> (mil. \$)
Personal consumption expenditures	1617
Gross private capital formation	528
Change in business inventory	24
Federal government purchases	122
State and local gov. purch.	496
Exports to rest-of-nation	2219
Other exports	245
Less: Imports from rest-of-nation	<u>2016</u>
Gross product value	3235

Of the \$3.2 billion gross regional product in 1977, one-half was accounted for by household purchases, while business investment and government purchases accounted for 17 percent and 19 percent, respectively. A positive net balance of trade accounted for the remaining 14 percent of the total.

Gross regional product, by definition, equals value added by remuneratively productive activity in the region. In 1977, \$2.6 billion, or 80 percent, of the total remuneratively productive activity was generated in the private sector. Thus, the value added by the private sector was slightly less than the total value of household and business purchases and net exports. Income payments received by the resident population from federal, state, and local governments thus slightly exceeded total government purchases in 1977. In short, a net transfer of less than \$40 million occurred from the public to the private sector in Northeast Minnesota.

The contribution of the Northeast Minnesota economy to Minnesota's balance of trade is illustrated in Table 1.2. The excess-supply industries,

Table 1.2. Industry gross output and requirements as a proportion of state, Northeast Minnesota, 1977.

Industry		Gross	Requirements		State
No.	Title	Out-put	Total	Ex-cess	Net Balance ^{1/}
(percent)					
1.	Agriculture For. Fish	1.0	4.7	- 3.7	-0.3
2.	Mining	93.0	17.1	75.9	1.1
3.	Construction	12.7	10.1	2.6	0.2
4.	Mfg., Nondurables	9.7	7.8	1.9	0.4
5.	Mfg., Durables	4.4	8.1	- 3.7	-0.7
6.	Tran., Com., Util.	9.3	9.4	- 0.1	<u>2/</u>
7.	Wholesale Trade	4.6	7.7	- 3.1	-0.2
8.	Retail Trade	8.5	7.2	1.3	0.1
9.	Fin., Ins., Real Est.	6.0	8.4	- 2.4	-0.4
10.	Services	6.8	7.4	- 0.6	<u>2/</u>
11.	Government	7.8	9.6	- 1.8	<u>2/</u>
12.	Sub-Total	8.3	8.1	0.2	0.2

^{1/} Excess of requirements to gross output, as percent of state, weighted by relative importance of specified industry requirements.

^{2/} Absolute value of .05 percent or less.

and retail trade, accounted for a net balance of payments for the state as a whole of more than \$130 million, or 0.2 percent of total state requirements of industrial output. The importance of each industry to the region or state is thus represented by several criteria, including net exports to rest-of-nation markets. Exports provide the economic base of a region or state and, hence, they are critical determinants of regional or state economic growth. Imports, on the other hand, represent "leakages", that is, economic requirements that impose a burden on the economic base. Two measures of imports are presented, namely, the imports of specified industry outputs from rest-of-nation and the imports by specified industry in the state or region of all industry output from rest-of-nation. Industry requirements, finally, are represented by industry output, minus exports, plus imports.

To understand the dynamics of demographic and economic change and consequences for employment and earnings in the region, a four-pronged approach is outlined. First, factors affecting the total population and its distribution are isolated and evaluated. Second, alternative population and employment futures are developed from this initial assessment. Third, the regional economic implications of the alternative futures are carefully and critically examined. Fourth, regional implications of alternative public policies and programs are examined.

BACK TO BASICS

Basic trends in regional economic growth and development are represented by population change. While birth rates in Northeast Minnesota are declining and also approaching state and national age-specific birth rates, migration rates change from year-to-year depending on both general and local economic conditions. Thus, area-to-area differences in population growth are attributed almost wholly to migration, particularly the level of in-migration relative to out-migration.

Population Change

Natural increase is the net change in total population due only to births and deaths. Births exceed deaths in Northeast Minnesota. Persistent economic decline and increasing out-migration of the resident labor force and of females in the age classes from 25 to 44 years would result in fewer births than deaths simply because households in the child-bearing and child-rearing age classes would decline.

While age-specific birth rates are high in Northeast Minnesota relative to Minnesota and the U.S. as a whole, total births per 1,000 population are close to state and national averages because of the total population structure. Northeast Minnesota has a higher proportion of older female population. Indeed, its total population is skewed toward the 45 to 49 years and older age classes.

Age-specific death rates compare closely with state and national averages. Again the overall average rate is high because of the larger proportion of total population in the 65 years and older age classes.

Age-specific migration rates in Northeast Minnesota differ from

statewide averages because of wide swings in the rates of in-migration. Rates of out-migration of teenagers and young adults remain fairly constant, although their total numbers are declining as teenagers and young adults decline in the total population. The sharp drop in U.S. birth rates starting in the early 1960's is an equally important factor in the dynamics of population change in Northeast Minnesota. Thus, rates of out-migration show remarkable uniformity among states and substate regions.

Changes in the levels of in-migration in Northeast Minnesota correspond closely with changes in job outlook. Migration into Northeast Minnesota increased as total employment increased in the 1970's. Large year-to-year fluctuations occurred because of several major construction projects which resulted in large increases in taconite production capacity.

In comparison with the state as a whole, a smaller proportion of residents -- 17 percent as compared to 21 percent -- change their county of residence in Northeast Minnesota than in Minnesota. Slightly less county-to-county change of residence in the 1975-80 period occurred in St. Louis County, which is part of the Duluth-Superior Standard Metropolitan Statistical Area (SMSA). According to the U.S. Census of Population, 31.2 thousand, or 15 percent of the 174.7 thousand St. Louis County residents who were five years and over in 1980, had not resided in St. Louis County in 1975. Of the 111.8 thousand persons five years and over residing in the six Northeast Minnesota counties outside of St. Louis County, only 14 thousand, or 13 percent, had resided in an SMSA in 1975.

The Northeast Minnesota and the statewide percentages for 1975 and

1980 are almost identical. In the aggregate, at least, the migration patterns for the Northeast compare closely with statewide migration patterns.

Industry Trends

Population growth in the urban places and rural areas of Northeast Minnesota in the 1970's can be attributed to the revitalization of the taconite mining industry, and the growth of retail trade and service industry employment. High earnings per worker in the basic industries, particularly mining and manufacturing, and large federal and state transfer payments to individuals, businesses, and local governments were the sources of large basic industry multipliers. They provide monetary support for an expanding diverse services-producing sector of the regional economy.

Employment

Employment expansion in export-producing industries in the 1970's accounted for the region's strong overall economic performance, as indicated in Table 2.1. Sources of employment change are represented by national-growth, industry-mix, and regional-share effects. The national-growth and regional-share effects are based on U.S. industry growth rates while the regional-share effect is based on the difference between Northeast Minnesota and U.S. industry growth rates. Both the national-growth and industry-mix effects were positive in the 1975-79 and 1979-80 periods.

The below-average employment growth in Northeast Minnesota can be attributed to the dominantly negative regional-share effects for the

Table 2.1. Wage and salary and proprietorial employment and sources of employment change in specified industry, Northeast Minnesota, 1975-1980

No.	Industry Title	Change 1975-79					Change 1979-80				
		1975	National Growth	Industry Mix	Regional Share	1979 (number)	National Growth	Industry Mix	Regional Share	1980	
1.	Farm	631	90	- 117	- 146	457	3	10	3	472	
2.	Agricultural Services	277	39	89	- 77	327	3	36	- 43	332	
3.	Mining	11839	1684	1670	- 825	14369	83	1481	-2869	13065	
4.	Construction	6970	992	900	-1671	7191	42	- 376	-1704	5153	
5.	Manufacturing Nondurable	9377	1334	- 510	-2050	8151	47	- 218	- 388	7593	
6.	Manufacturing Durable	6707	954	361	186	8212	48	- 393	- 373	7494	
7.	Transp. and Public Utilities	9126	1299	- 133	-1399	8892	52	- 9	- 488	8448	
8.	Wholesale Trade	4823	686	114	- 500	5123	30	98	- 349	4902	
9.	Retail Trade	20125	2863	972	- 207	23753	138	- 218	- 406	23267	
10.	Finance, Ins., Real Estate	3158	449	162	150	3920	23	114	- 41	4016	
11.	Services	22009	3132	917	-1256	24803	144	635	-1089	24494	
12.	Federal, Civilian	2505	356	- 324	- 83	2455	14	32	- 2	2499	
13.	State and Local Government	22622	3219	-1299	- 773	23770	138	5	173	24087	
14.	Federal Military	3053	434	- 572	166	3082	18	- 17	- 173	2910	
15.	Farm Proprietors	3532	503	- 633	67	3468	20	- 33	10	3466	
16.	Nonfarm Proprietors	8484	1207	- 76	28	9643	60	527	- 329	9897	
17.	Total	135241	19241	1521	-8390	147617	863	1674	-8067	142096	

1975-79 period. More specifically, the overall negative regional-share effect was the result of negative regional-share effects for the region's basic industries in the mining, manufacturing, trade, and service sectors.

Yearly data show that the overall negative regional-share effect is due to the prevasively large negative regional-share effects in the 1976-77 period. Mining industry employment was low in 1977 because of a prolonged strike in this industry. Its negative effects were felt in the residentiary industries. Reduced levels of mining resulted in reduced levels of industry employment elsewhere in the regional economy. This pattern of employment decline was repeated in 1980.

Earnings

Total earnings of the employed work force in each industry group in Northeast Minnesota are summarized for 1975, 1979, and 1980 in Table 2.2. The total earnings estimates include both wage and salary payments and proprietorial income in constant 1977 dollars.

Change in total real earnings for the 1975-79 period correspond closely with the overall pattern of employment change in the same pattern, but with relatively larger negative regional-share effects. However, in the 1979-80 period, the national-growth effect was negative (because of the decline in aggregate real earnings in the U.S.). Only the overall industry-mix effect remained positive. The relative decline in overall real earnings in the Northeast was much larger than in the U.S.

Year-to-year changes in the regional-share effect for real earnings also correspond with year-to-year changes in employment, given the overall reduced levels of real earnings per worker. Nonetheless, industry-to-industry differences persist in real earnings change sources.

Table 2.2. Total personal income and sources of income change (in 1977 dollars) for specified type of income, Northeast Minnesota, 1975-80.

No.	Industry Title	1975	Change 1975-79			1979	Change 1979-80			
			National Growth	Industry Mix	Regional Share		National Growth	Industry Mix	Regional Share	
			(thousand \$)							
1.	Wages and Salary	1510335	298895	- 1963	-83521	1723661	19477	-32577	- 99800	1610748
2.	Other Labor Income	108266	21426	25248	6766	161709	1827	5999	- 11869	157659
3.	Proprietorial Income	86596	17137	- 5429	-10825	87483	989	-10804	7025	84694
4.	Total Earnings	1705197	337458	17856	-87580	1972853	22293	-37382	-104644	1853101
5.	Contribution to Soc. Insur.	- 88147	- 17442	- 4108	6681	- 103013	- 1164	2390	5449	- 96340
6.	Residence Adjustment	- 14352	- 2840	2685	- 113	- 14620	- 165	1455	2436	- 10895
7.	Net Earnings	1602698	317174	16433	-81012	1855220	20964	-33537	- 96759	1745866
8.	Property Income	227680	45058	17600	- 2550	287798	3252	18505	1842	311378
9.	Transfer Payments	318877	63106	-35144	3051	349890	3954	20503	15535	389865
10.	Total Personal Income	2149255	425338	- 1111	-80511	2492908	28170	5471	- 79382	2447109

Income

Change sources for total personal income in Northeast Minnesota are presented in Table 2.3. In the 1975-79 period, both overall income-mix and regional-share effects were negative largely as a result of (1) a disproportionately small increase in U.S. transfer payments and (2) a disproportionately small increase in real earnings. Thus, growth in Northeast Minnesota personal income was at a below-average rate.

Growth in U.S. transfer payments in the 1979-80 period removed the negative income-mix effect. However, an even larger negative regional-share effect maintained a negative overall regional-share effect for the 1979-80 period. Impact of reduced employment and earnings levels in mining on the total economy is demonstrated in the annual data series.

Finally, the industry employment trends illustrate the dynamics of demographic change in the 1970's, particularly in the 1975-80 period. Expansion in goods-producing industry employment supported expansion in services-producing industry employment, as shown in Table 2.4. Conversely, decline in goods-producing employment, especially when coupled with decline in government employment, supports expansion in services-producing employment. Much of the economic base of Northeast Minnesota is included in its goods-producing and government sectors.

Table 2.3. Total personal income and sources of income change (in 1977 dollars) for specified type of income, Northeast Minnesota, 1975-80.

No.	Industry Title	1975	Change 1975-79			1979	Change 1979-80			
			National Growth	Income Mix	Regional Share		National Growth	Income Mix	Regional Share	
(thousand \$)										
1.	Wages and Salary	1510335	298895	- 1963	-83521	1723661	19477	-32577	- 99800	1610748
2.	Other Labor Income	108266	21426	25248	6766	161709	1827	5999	- 11869	157659
3.	Proprietorial Income	86596	17137	- 5429	-10825	87483	989	-10804	7025	84694
4.	Total Earnings	1705197	337458	17856	-87580	1972853	22293	-37382	-104644	1853101
5.	Contribution to Soc. Insur.	- 88147	- 17442	- 4108	6681	- 103013	- 1164	2390	5449	- 96340
6.	Residence Adjustment	- 14352	- 2840	2685	- 113	- 14620	- 165	1455	2436	- 10895
7.	Net Earnings	1602698	317174	16433	-81012	1855220	20964	-33537	- 96759	1745866
8.	Property Income	227680	45058	17600	- 2550	287798	3252	18505	1842	311378
9.	Transfer Payments	318877	63106	-35144	3051	349890	3954	20503	15535	389865
10.	Total Personal Income	2149255	425338	- 1111	-80511	2492908	28170	5471	- 79382	2447109

Government

321928

POSING THE OPTIONS

To simplify the task of the future Northeast Minnesota population and employment, two projections of the future are presented, namely, a baseline projection and a differential projection. The baseline projection show a slightly increasing population while the differential projection anticipates reductions in the region's economic base. The baseline projection postulates population changes derived solely from natural increase, that is, births minus deaths. The original differential projection implies an increase in out-migration and/or a decrease in labor force participation rates. These adjustments, in turn, reduce high unemployment levels associated with the anticipated reduction in mining and related service employment and earnings.

Baseline Projection

The baseline population projection starts from current levels of population and labor force in Northeast Minnesota. Expected age-specific birth rates and age-specific and gender-specific death rates are used to derive the natural increase in total population, by age and gender, for the two five-year periods, 1980-85 and 1985-90, as shown in Table 3.1.

Age-specific and gender-specific labor force participation rates of the 1970-80 period are adjusted to their long-term trends in deriving the total labor force for 1985 and 1990, as shown in Table 3.2. Total baseline labor force minus total baseline unemployment (of roughly 12 percent) equals total baseline employment. Employment levels are postulated, by industry and occupation, which are consistent with the baseline labor force projections.

Age Class and Gender	Estimated 1970	Projected				Change from 1980			
		1985		1990		1980-1985		1980-1990	
		Base- line	Differ- ential	Base- line	Differ- ential	Base- line	Differ- ential	Base- line	Differ- ential
		(number)							

Male:

0-4	12875	13270	15270	11464	15632	9486	2000	- 1806	2362	- 3784
5-9	16991	12763	13165	13197	15159	13525	402	434	2396	762
10-15	22916	16916	15512	14879	15622	13546	- 1404	- 2019	- 1294	- 3370
16-19	13398	13715	10930	8662	10197	8334	- 2785	- 8254	- 6719	- 8582
20-24	9948	13388	16727	12207	13594	6751	1339	- 3181	- 1794	- 8637
25-29	8497	14959	15265	14834	16594	9016	306	- 125	1635	- 5943
30-44	24550	30085	36617	28744	42082	33146	6532	- 1341	11997	3061
45-64	36545	33207	31363	31771	31249	26928	1844	- 1436	- 1958	- 6279
65 and over	17395	19678	20420	19655	20813	20008	742	- 23	1135	330
Total Male	163192	169981	175275	155411	180943	140740	5294	-14570	10962	-29241

Female:

0-4	12280	12430	14458	10845	14796	8975	1028	- 2585	1366	- 4455
5-9	16141	12094	12359	12560	14377	12823	265	466	2283	729
10-15	21683	16031	14688	14331	14673	12924	- 1343	- 1700	- 1358	- 3107
16-19	12416	13180	10344	8082	9722	7903	- 2836	- 5098	- 3458	- 5277
20-24	10765	15213	16185	11422	12919	5946	- 972	- 3791	- 2294	- 9267
25-29	8681	14302	15163	13674	16132	7548	- 861	- 328	1830	- 6754
30-44	25483	28995	35136	29726	40593	32955	- 6141	- 731	11598	3960
45-64	37382	34914	32903	31237	32927	26425	- 2011	- 3677	- 1987	- 8489
65 and over	20855	26204	28475	24668	30047	24136	- 6439	-10246	- 4867	-10778
Total Female	165686	173363	179711	156545	186185	139635	6348	-16818	12822	-33728
Total	328878	343344	354986	311956	367128	280375	11642	-31388	23784	-62969

Table 3.2. Total civilian labor force of specified age class and gender, Northeast Minnesota, 1970-1990.

Age Class and Gender	Estimated 1970	Estimated 1980	Projected				Change from 1980			
			1985		1990		1980-1985		1980-1990	
			Base- line	Differ- ential	Base- line	Differ- ential	Base- line	Differ- ential	Base- line	Differ- ential
			(number)							
Male:										
16-19	6087	7216	5192	4026	4819	3755	-2024	-3190	-2397	-3461
20-24	7988	12612	14069	10267	11393	5658	1457	-2345	-1219	-6954
25-29	8038	13541	14404	13998	15608	8480	883	457	2067	5061
30-34	7426	11929	14020	12098	14260	13084	2091	169	2331	1155
35-44	16251	14994	20755	15189	25653	18331	5761	195	10658	3337
45-54	16731	14271	13084	11452	14700	10664	-1187	-2819	429	-3607
55-64	16252	12849	12260	13990	10930	11164	-589	1141	-1919	-1685
65 and over	2572	2501	2131	2052	2033	1955	-370	-449	-468	-546
Total Male	80027	89913	95915	83071	99396	73091	6002	-6842	9483	-16822
Female:										
16-19	4952	6485	4263	3304	4040	3117	-2222	-3181	-2445	-3368
20-24	5260	9532	11745	8289	9529	4386	2213	-1243	3	-5146
25-29	2906	7925	8614	7768	9451	4422	689	-157	1526	-3503
30-34	3263	6221	8094	6784	8851	7429	1873	563	2630	1208
35-44	7706	9167	11345	9660	14175	11277	2178	493	5008	2110
45-54	9681	8376	7551	6310	8612	6028	-825	-2066	236	-2348
55-64	6311	7734	6538	6847	5941	5451	1196	-887	-1793	-2283
65 and over	1711	1792	1850	1603	1874	1506	58	-189	82	-286
Total Female	41791	57233	60000	50572	62473	43616	2767	-6661	5240	-13617
Total	121818	147146	155915	133643	161869	116708	8769	-13483	14723	-30438

Regional Differences

An alternative population future is derived from the proposition that population follows jobs. The dynamics of regional demographic change start with the level of regional economic activity.

Although a pre-eminant societal goal for a region may be to balance the number of new entrants into the labor force with the number of voluntary retirees, in reality a region experiences recurring imbalances between the supply of, and the demand for, labor. What ultimately determines the size and character of a region's labor force and population is the demand for its industry output and the constraints imposed on its industry performance. In short, the number of persons residing in Northeast Minnesota depends on the number of employment opportunities and their economic linkages, direct and indirect, with all industries in the region and in the rest-of-nation.

The alternative future population scenario for Northeast Minnesota is represented by a series of regional differential projections of total population and labor force derived from the Northeast Minnesota Regional Economic Impacts Forecasting System (REIFS) and its computer model of the Northeast Minnesota economy.^{1/} The differential projection series show much lower levels of total population and labor force than in the baseline projection series. In short, the differential projection series imply much out-migration of the 1980 resident population in all age classes.

Different projected changes in population and labor force levels under the two demographic options also are compared in Tables 3.1 and 3.2.

^{1/}Richard Lichty and Peter Stenberg, Northeast Minnesota SIMLAB projection series, unpublished data, 1983. An intermediate, or most probable, projection series is now available for comparison with the baseline and the differential series presented in this report.

While both population and labor force are projected to increase in the baseline option, they generally decline in the differential option.

The generally lower differential projection series is represented by the predominantly negative values in Table 3.3. This table summarizes the differences in projected population and labor force in the two demographic options.

Economic effects of a changing regional population range from changes in consumption patterns and tastes to place and type of work. Both the baseline and the differential projections show an ageing population, in part, less dependent on a full-time job, but still seeking essential social services.

Labor Force Participation

Population redistribution and change leads to changes in labor force participation. In 1980, labor force participation rates were lower in Northeast Minnesota than Minnesota because of the low participation rate for the female population, as shown in Table 3.4. This rate had increased in the 1970's. They are projected to increase again in the 1980's.

Unemployment rates, that is, the percentage of the total labor force not employed, were higher in Northeast Minnesota than in the rest-of-state. These rates are projected to decline in the 1980's with economic recovery and net population out-migration.

Nearly three-fourths of all employed persons were private wage and salary workers for both Northeast Minnesota and Minnesota as a whole. The slightly lower percentage of wage and salary workers, and, also, self-employed persons in Northeast Minnesota occurs because of the

Table 3.3. Projected population and labor force difference in specified age class and gender between differential and baseline projections, Northeast Minnesota, 1985 and 1990.

Age Class and Gender	Population		Labor Force	
	1985	1990	1985	1990
(number)				
Male:				
0-9	- 3767	- 7780	--	--
10-15	- 633	- 2076	--	--
16-19	- 2268	- 1863	- 1166	- 1064
20-24	- 4520	- 6843	- 3802	- 5735
25-29	- 431	- 7578	- 406	- 7128
30-34	- 2037	- 1251	- 1922	- 1176
35-44	- 5836	- 7685	- 5566	- 7322
45-54	- 1886	- 4528	- 1632	- 4036
55-64	+ 2279	+ 307	+ 1730	+ 234
65 and over	- 765	- 805	- 79	- 78
Total Male	-19864	-40203	-12844	-26305
Female:				
0-9	- 3412	- 7375	--	--
10-15	- 357	- 1749	--	--
16-19	- 2262	- 1819	- 959	- 923
20-24	- 4763	- 6973	- 3456	- 5143
25-29	- 1489	- 8575	- 846	- 5029
30-34	- 2308	- 2427	- 1310	- 1422
35-44	- 3102	- 5211	- 1685	- 2898
45-54	- 2499	- 5143	- 1241	- 2584
55-64	+ 833	- 1304	+ 309	- 490
65 and over	- 3807	- 5911	- 240	- 368
Total Female	-23166	-46550	- 9428	-18857
Total	-43030	-86690	-22272	-45162

Table 3.4. Total population and total labor force in specified gender, Northeast Minnesota, 1980 and 1990.

Population Indicator and Gender	1980	Projected 1990	
		Baseline	Differential
(number)			
Male:			
Population, total	169981	180943	140740
Under 16	42949	46413	36557
16 or more	127032	134536	104183
Labor Force, total	91211	100741	73091
Employed, civilian	78819	92418	61275
Military	1304	1345	988
Unemployed	11088	6948	11478
Female:			
Population, total	173363	180185	139635
Under 16	40555	43846	34722
16 or more	132808	142339	104913
Labor Force, total	57408	62649	46587
Employed, civilian	52725	59640	41518
Military	175	176	132
Unemployed	4508	2913	4937

relatively high level of government employment -- federal, state, and local. Local and federal government employment in Northeast Minnesota is nearly 50 percent higher than in Minnesota as a whole. This is equivalent to an additional 7,061 jobs in the government sector rather than in the private sector. Government employment is projected to decline in the 1980's, although its relative standing would remain high as a source of jobs and income for the resident population. Total employment on a person-count basis is, of course, lower than total employment on a job-count basis, as presented earlier in Table 3.4.

Data on the geographical distribution of population and labor force show large county-to-county differences in both labor force participation and unemployment rates. These differences, which stem, in part, from the population changes cited earlier, would be reduced with economic recovery and the projected shift in services-producing jobs to the population growth areas in the less urbanized counties.

Occupational Distribution

Changes in the industry distribution of employment in Northeast Minnesota were summarized earlier for the 1975-79 and 1979-80 period in Table 2.1. Two sources of employment change were presented, namely, proportional and differential. Proportional changes are the external changes associated with individual U.S. industry growth rates. The differential change represent differences between county and U.S. industry growth rates. The differential changes in employment from 1975 to 1979 are associated also with changes in the distribution of population.

The industry distribution of 1980 employment on a job-count and a person-count basis will differ because of multiple job-holding and

commuting. The total number of jobs is shown by place of work while the total number of employed persons is shown by place of residence. A person may be employed in more than one job. He also may commute from his county of residence to his county of work. The occupation distribution of employment, on the other hand, is shown according to place of residence in Table 3.5.

The county occupation profiles differ from the Minnesota occupational profiles because of differences in industry distribution. For example, an above-average number of transportation jobs were reported in St. Louis County in 1980. Compared with Minnesota as a whole, the St. Louis County figure was 460 higher than it would have been if transportation employment had been 4.6 percent, rather than 5.2 percent, of total employment. Implicit in the Northeast Minnesota employment projections to 1990 (which are on a job-count basis) is some decentralization of trade and service jobs. Specified service and manufacturing employment, especially if linked to other Minnesota industry, is likely to be concentrated in the Duluth urbanized area.

Table 3.5. Proportion of total civilian employed persons in specified industry, by county of residence, Northeast Minnesota, 1980.

No.	Industry Title	Atktn	Carlton	Cook	Itasca	Koochi- ching	Lake	St. Louis			Total Region	Minnesota
								Total	Duluth	Remainder		
(percent)												
1.	Agric., For., Fish., Min.	11.0	3.8	10.3	14.1	3.0	21.0	13.3	1.1	23.0	12.3	6.7
2.	Construction	10.2	6.7	8.8	6.1	5.5	12.8	5.7	4.5	6.7	6.3	5.3
3.	Manuf. Non-Durable Goods	2.7	14.0	1.1	9.3	20.1	1.7	4.5	6.0	3.3	6.4	7.0
4.	Manuf. Durable Goods	9.0	12.1	9.7	5.7	11.2	8.1	5.8	6.0	5.7	6.8	13.2
5.	Transportation	2.8	4.1	2.8	2.9	3.7	6.6	5.2	6.4	4.2	4.7	4.6
6.	Communications & Utilities	2.7	2.7	2.0	4.3	1.7	3.0	3.5	4.4	2.8	3.4	2.2
7.	Wholesale Trade	1.5	2.6	1.2	2.2	1.0	0.7	3.5	4.1	3.1	3.0	4.9
8.	Retail Trade	20.6	16.7	17.7	17.6	19.1	16.0	18.5	20.0	17.3	18.2	17.0
9.	Fin., Ins., and Real Estate	3.9	3.4	1.5	3.1	2.3	2.3	3.9	4.3	3.5	3.6	5.7
10.	Business, Repair Services	2.7	2.7	1.9	2.7	2.0	0.6	2.7	3.2	2.4	2.6	3.8
11.	Pers., Enter. & Rec. Svcs.	5.3	3.3	16.6	4.3	5.1	5.2	4.0	4.5	3.7	4.3	3.7
12.	Health Services	8.6	10.8	6.5	8.2	8.4	5.4	9.8	11.8	8.2	9.4	8.9
13.	Educational Services	9.6	9.1	8.3	10.5	9.6	8.2	9.7	11.9	7.9	9.7	9.0
14.	Other Services	3.3	2.8	3.4	3.6	2.2	2.3	4.4	5.9	3.2	3.9	4.2
15.	Public Administration	6.0	5.1	8.3	5.3	5.1	5.9	5.4	5.9	5.1	5.4	3.7
16.	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: U.S. Bureau of the Census, 1980 Census of Population, Summary, Tape File 3, Table 65.

SHAPING THE FUTURE

Export expansion and import substitution are two different strategies for regional economic development. Export expansion in Northeast Minnesota is not necessarily confined to its existing export-producing industries -- taconite pellet production, timber-related manufacturing, tourism-and-recreation-related services, and educational and health care institutions. It may include, also, new basic industries which are closely related to the expanding urban-industrial complex centered on Minneapolis and St. Paul.

Unlike export expansion, import substitution is confined to existing imports and their regional markets. These markets include other producing industries and the final demand sectors -- household, business (private capital formation), and government. Opportunities for import substitution are limited by superior investment opportunities in export expansion, either in the region or elsewhere in the nation.

Regional export expansion and import substitution strategies are intended to increase regional employment and income. However, the actual short-run effects may coincide with intended effects, or they may trigger adverse short-run effects, but positive long-run effects, because of interindustry linkages. The larger the economy, the more complex the spillover effects among other industries in the region.

Building on What's Here

Export expansion strategies address the viability of the region's economic base, its export-producing industries. Employment expansion in export-producing industries in the 1970's accounted for the region's

strong overall economic performance, as indicated earlier in Tables 2.1 to 2.3. The series of three tables are based on the most recent statistical reports of the U.S. Department of Commerce to show recent trends in wage and salary and proprietorial employment and, also, earnings for a 16-industry group. A 214-industry breakdown was used, however, in deriving the industry performance indicators in Table 4.1.

Industry candidates for export expansion include the 50 export-producing industries in 1977 and, also, many of the deficit-supply industries. The outputs of these industries fall short of meeting regional requirements and, hence, imports from these industries in the rest-of-nation compete with the local industries in local markets.

Another name for import substitution is hometown loyalty: support your local merchant, your local dairy, or your local packer. Import substitution works when local merchants can beat the outside competition in product price and/or quality and, also, service. For many products, the outside competitor has advantages of size in production and procurement, and even distribution. Its tough to beat outside competition and, besides, the market economy is based on trade. Each area finds its own comparative advantage and the market niche in which its own products compete successfully with products of other areas.

Import substitution options in Northeast Minnesota are limited simply because of its size. The larger and more populous the area, the more diversified is the local economy, that is, the more options for import substitution. In recent years, the Northeast Minnesota economy has experienced a deficit supply in 156 of its 214 industries. No production is reported for 65 of the 156 deficit-supply industries. Thus, some gross output is reported for 91 industries but this output is less than total

Table 4.1. Gross Output, Exports, and Imports of Specified Industry, Northeast Minnesota and Minnesota, 1977

Industry No. Title	Gross Output		Exports		Imports ^{1/}		Requirements ^{2/}		Imports ^{3/}	
	Northeast	State	Northeast	State	Northeast	State	Northeast	State	Northeast	State
(million \$)										
1. Ag, For., Fish	53	5,361	0	936	191	698	246	5,122	18	393
2. Mining	910	978	894	896	149	887	166	970	199	88
3. Construction	616	4,845	173	372	20	1,258	463	4,599	147	514
4. Mfg., Nondurables	1,321	13,552	780	4,314	455	3,489	996	12,727	474	1,796
5. Mfg., Durables	481	11,046	125	3,091	671	4,716	1,027	12,671	125	1,699
6. Tran., Com., Util.	481	5,171	121	506	122	478	482	5,143	77	581
7. Wholesale Trade	191	4,159	0	804	68	0	259	3,356	15	90
8. Retail Trade	432	5,055	82	220	0	0	350	4,835	49	112
9. Fin., Ins., Real Est.	651	10,865	14	54	296	272	933	11,083	61	218
10. Services	315	4,649	51	560	43	46	307	4,136	50	329
11. Government ^{4/}	61	777	0	631	13	60	74	774	9	56
12. Subtotal	5,312	66,458	2,240	11,815	2,029	10,773	5,301	65,416	1,223	5,877

^{1/} Imports from specified (row) industry in rest-of-nation.

^{2/} Region requirements of specified (row) industry output.

^{3/} Import purchases by specified (column) industry in region.

^{4/} Government enterprise and scrap.

regional requirements and, hence, deficit supply is indicated for each industry.

Industry Performance

Industry performance indicators -- output, requirements, exports and imports -- in the seven-county Northeast Minnesota region, when compared with corresponding statewide industry indicators, show that Northeast Minnesota accounted for \$5.3 billion of the State's gross output of \$66.5 in 1977. They also show the region accounted for \$2.2 billion of the State's exports of \$11.8 billion and \$2.1 billion of the State's imports of \$10.8 billion. Industry gross output, less exports and plus imports, is equal to total industry requirements. Because exports exceed imports in both Northeast Minnesota and Minnesota, overall industry requirements were slightly less than overall gross output in 1977.

Imports, by industry destination, are much less than imports by industry of origin because final purchases are excluded. In Northeast Minnesota, the 1977 value of intermediate purchases was \$1.2 billion as compared with \$800 million of final purchases. Households, via their retail purchases, account for most final purchases of imports.

The relative importance of Northeast Minnesota in the State's economy is shown by the series of five economic indicators as follows:

<u>Economic Indicator</u>	<u>Percent of State</u>
Gross output	8.0
Exports	19.0
Imports, by origin	18.8
Requirements	8.1
Imports, by destination	
Intermediate	20.8
Final	16.5

Clearly, Northeast Minnesota accounts for a highly disproportionate share of Minnesota exports and imports. Also, Northeast Minnesota industry is more import-dependent than export-dependent, as shown by its slightly larger share of the State's industry imports than its industry share of the State's industry exports.

The percentage distribution of industry output, exports, imports, and requirements among Northeast Minnesota industries provides a measure of a region's export and import dependence. For example, the key role of taconite mining in the economic base of Northeast Minnesota is represented by its 39.9 percent share of industry exports. Timber-related industry (in pulp and paper production) and food products manufacturing account for much of the nondurable manufacturing industry's 34.8 percent share of the economic base. All government-supported activity is excluded from exports and other indicators of regional economic activity.

Dependence of both Northeast Minnesota and Minnesota on imports from manufacturing industries is demonstrated by their high share -- 55.5 percent and 76.2 percent, respectively -- of total imports. The region differs from the state, however, in the destination of these imports, with more being directed into final, rather than intermediate, use.

Projected levels of exports and imports show large differences between baseline and differential options. The baseline exports option, which is geared to projected U.S. growth rates in industry output, shows, in Table 4.2., growth in every industry. (Regional market share is assumed constant in these projections.) The differential option, however, shows, at best, exports returning to 1977 levels by 1990. In this differential projection series, exports of manufactured goods decline, while exports of taconite pellet shipments remain constant.^{2/}

Exports, that is, sales of goods and services produced in Northeast Minnesota to non-resident buyers, are a critical measure of both a region's economic viability as well as its economic vulnerability. Exports also affect imports. Implicit in a projected growth or decline in exports is corresponding growth or decline in imports. Import substitution strategies, when manifested in new successful businesses catering entirely to local markets, would lessen the close correlation between exports and imports.

Projected employment levels, which are summarized in Table 4.3, show wide differences between the two development options. While the baseline option envisions employment increases beyond 1980 levels, the differential option envisions reductions in employment to pre-1970 levels following a period of modest recovery from the 1981-82 recession.

Largest employment growth is expected in the trade and services industries in the baseline option. Nonfarm proprietorial employment would

^{2/}An alternative differential projection series shows a reduction in the value of taconite pellet exports from \$1235 million to \$786 million in 1985 and \$712 million in 1990. Corresponding employment levels would decline from 12.5 thousand to 9.5 thousand in 1985 and from 11.3 thousand to 7.9 thousand in 1990. On the other hand, the alternative series shows corresponding increases in manufacturing industry exports and employment.

Table 4.2. Total Value of Exports (in 1977 Dollars) In Specified
Industry, By Development Option, Northeast Minnesota, 1977-1980.

<u>Industry</u>		Estimated	<u>Projected</u>			
			<u>Baseline Differential</u>			
No	Title	1977	1985	1990	1985	1990
(million \$)						
1.	Agr., For., Fish	0	3	4	0	0
2.	Mining	894	1236	1248	1235	1235
3.	Construction	173	214	226	214	226
4.	Mfg., Nondurables	780	935	1038	601	574
5.	Mfg., Durables	125	179	212	144	154
6.	Tran.,Comm., Utilities	121	160	185	148	170
7.	Wholesale Trade	0	15	18	0	0
8.	Retail Trade	82	91	114	106	155
9.	Fur., Ins., Real Estate	14	2	3	0	0
10.	Services	51	80	94	15	17
11.	Scrap, Used	0	1	1	0	0
12.	Total	2240	2488	2659	2270	2317

Table 4.3. Total employment (job count) in specified industry, by development option, Northeast Minnesota, 1975-1990.

Industry No. Title	Estimated				Projected			
	1975	1977	1979	1980	Baseline 1985	1990	Differential 1985	1990
(thousands)								
Wage and Salary:								
1. Agriculture	0.6	0.5	0.5	0.5	0.4	0.4	0.3	0.2
2. Ag, Sew., For., Fish.	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.1
3. Mining	11.8	10.5	14.4	13.1	13.1	13.6	9.6	7.9
4. Construction	7.0	6.0	7.2	5.2	5.3	5.9	6.2	6.0
5. Mfg., Nondurables	9.4	9.4	8.2	7.6	7.4	7.9	7.3	5.8
6. Mfg., Durables	6.7	6.8	8.2	7.5	7.3	7.5	6.9	6.6
7. Trans., Comm., Util.	9.1	8.5	8.9	8.4	8.0	8.1	6.7	5.8
8. Wholesale Trade	4.8	4.8	5.1	4.9	5.2	5.5	3.5	3.0
9. Retail Trade ^{1/}	20.1	22.0	23.8	23.4	25.6	28.0	21.4	20.2
10. Fin., Ins., Real Est.	3.2	3.8	4.0	4.0	4.8	5.5	3.1	2.8
11. Services	22.0	23.9	24.8	24.4	27.3	32.0	24.0	24.9
12. Federal,	2.5	2.4	2.5	2.5	2.4	2.5	2.2	1.9
13. State and Local	22.6	22.1	23.8	24.1	24.5	25.2	20.8	18.4
14. Fed., Military	3.1	3.0	3.1	2.9	2.9	2.9	2.5	2.2
Proprietorial:								
15. Farm	3.5	3.5	3.5	3.5	3.4	3.3	2.1	1.9
16. Nonfarm	8.5	9.0	9.6	9.9	10.5	11.5	9.1	8.6
17. Total	135.2	136.4	147.6	142.1	150.0	161.2	120.9	111.0

^{1/} Including eating and drinking places.

increase, also. Only modest growth is projected in the manufacturing industries while mining employment would increase slightly (although not necessarily in taconite pellet production). Government employment would remain roughly at its 1980 levels while construction employment would rise slightly to its 1980 level by 1985.

Employment growth, if any, would be confined to the services industry group in the differential option. The sharp decline in export-producing employment in manufacturing results in reduced levels of growth in trade and services employment. Local government employment would decline because of lower levels of population and financing of local services.

Development Options

Historical trends and alternative projection series presented earlier are now summarized for the purpose of similarly addressing the content and impact of export expansion and import substitution strategies in Northeast Minnesota. These strategies are invariable and inevitably conditioned by the current status of regional and national economies as well as their perceived long-term prospects and potentials. Central to the question of regional sensitivity to changing national economic conditions is industry structure, particularly the mix and organization of export-producing businesses.

Northeast Minnesota industry structure has been represented by its industry output, exports, and imports, and related employment levels, including the distribution of employment according to size of establishment. Perceived long-term industry prospects for export expansion and import substitution are represented by a certain range of regional development

options as depicted by a baseline and a differential projection series. The baseline option is derived from the simple assumption that Northeast Minnesota population and industry will experience the same rates of growth as corresponding categories of population and industry in the nation as a whole.

The differential option is derived from a complex set of assumptions relating to the competitive position of the region's export-producing industries, particularly manufacturing. In the differential option, manufacturing, rather than taconite mining, exports and employment are expected to decline sharply in the 1980's. The overall employment effects of reduced manufacturing activity in this option are roughly equivalent to the overall employment effects of reduced mining activity in the alternative option noted earlier. The differential option thus represents a baseline for measuring the economic effects of selected export expansion and import substitution strategies in basic industries, except taconite mining, which already assumes a successful implementation of output-sustaining strategies for the U.S. iron and steel industry.

In the 75-industry breakdown of the Northeast Minnesota economy, industry differences of more than 300 in expected 1990 employment levels under the two development options are identified as follows:

Excess-Supply Industry			Deficit-Supply Industry		
No.	Title	Difference	No.	Title	Difference
63.	Retail Trade	5,400	76.	Military	700
66.	Hotels, Personal Service	2,500	77.	Other State and Local	6,400
68.	Eating & Drinking Places	2,400			
71.	Health Services	7,600			
72.	Educ., Nonprofit	1,900			
	Total	27,800			15,600

Much of the expected difference in employment between the two options thus originates in the trade and service industries. These industries include the potential candidates for the successful development of export expansion and import substitution strategies.

Clearly demonstrated in the comparison of the selected Northeast Minnesota and Minnesota indicators of industry activity is the heavily commodity-producing, natural-resource dependent, and highly specialized character of the Northeast Minnesota economy. These characteristics sharply differentiate the Northeast Minnesota economy from the overall Minnesota economy, as illustrated in Table 4.4. For example, total civilian employment in Northeast Minnesota is expected to decline from 124 thousand in 1982 to 118 thousand in 1985 and 109 thousand in 1990. Meanwhile, the statewide civilian employment total would increase from its 1982-83 low of approximately 2.0 million to 2.2 million in 1985 and 2.3 million in 1990. If employment in each industry were to change at their corresponding U.S. rates, both Northeast Minnesota and Minnesota employment totals would increase to six percent and 14 percent above their 1980 levels by 1985 and 1990, respectively. Thus, the two development options provide contrasting patterns of employment and general economic growth in the region and the state.

Regional Revitalization

The potential for regional revitalization depends on the long-term viability of a region's economic base. Long-term industry viability depends, in term, upon its natural and human resources and its capacities for entrepreneurship in both the business and the government sectors of the Northeast Minnesota economy. These issues are addressed in public

Table 4.4. Total civilian employment (job count), by development option, Northeast Minnesota and Minnesota, 1975-1990.

Year	Region		State	
	Base-line	Differ-entia	Base-line	Differ-entia
(thousands)				
1975		132		1794
1976		137		1836
1977		133		1897
1978		142		1996
1979		146		2078
1980		139		2088
1981	141	135 ^{1/}	2120	2056 ^{1/}
1982	140	124 ^{1/}	2097	2014 ^{1/}
1983	140	122	2086	2013
1984	143	120	2146	2096
1985	147	118	2216	2180
1990	158	109	2371	2313

^{1/} Estimated from current labor market reports prepared by the Minnesota Department of Economic Security.

programs and policies affecting (1) job training and outlook, and (2) small business development.

Job Training and Outlook

Public programs and policies relating to job training and outlook have consequences for total population and labor force. They affect the levels of total personal income as well as long-term job prospects. In Northeast Minnesota, wages and salaries and other participation income account for a smaller proportion of total personal income than in Minnesota as a whole because social security, public assistance, and all other transfer payments account for a larger share of the total. Also, the number of workers per household in Northeast Minnesota is lower than in Minnesota. Thus, per capita income is low, not because earnings per worker are low, but because of low labor force participation.

Since household income relates to earnings per worker and the number of workers per household, the question of new job openings and access to these openings become important in a household's search for means of increasing existing income levels -- earnings per worker vary, of course, with occupation.

The association of industry distribution with occupation distribution is represented directly by the occupational, that is, the staffing, pattern of each industry. To project employment by occupation, industry employment levels are derived, first, for selected years. The projected industry employment levels are summarized in Table 4.5 for the 16-industry breakdown presented earlier and the baseline and the differential options.

U.S. industry growth rates are used in deriving the projected baseline employment change from 1980 to 1985 and 1985 to 1990. Thus, the

Table 4.5. Wage and Salary Employment in Specified Industry and Proprietorial Employment, By Source of Employment Change and Demographic Option, Northeastern Minnesota, 1980-85 and 1985-90.

Industry No.	Title	BASELINE OPTION				DIFFERENTIAL OPTION						
		Change 1980-85		Change 1985-90		Change 1980-85		Change 1985-90				
		1980	1980-85	1985	1985-90	1990	Proportional	Differential	1985	Proportional	Differential	1990
Wage and Salary Employment												
1.	Farm	472	-25	447	-47	400	-25	-153	294	-31	-38	225
2.	Agricultural Services, Forestry, Fisheries	332	-21	311	18	329	-21	-175	136	8	-25	119
3.	Mining	13,065	18	13,083	490	13,573	18	-459	9,624	473	-2,111	7,873
4.	Construction	5,153	144	5,297	621	5,918	144	916	6,213	728	-917	5,024
5.	Manufacturing, Non-Durables	7,593	-177	7,416	345	7,761	-177	-52	7,364	343	-1,939	5,768
6.	Manufacturing, Durables	7,494	-180	7,314	149	7,463	-180	-440	6,874	79	-461	6,553
7.	Transportation, Communi- cation, and Utilities	8,448	-452	7,996	72	8,068	-452	-1,322	6,674	60	-930	5,804
8.	Wholesale Trade	4,902	289	5,191	283	5,474	289	-1,684	3,507	191	-728	2,970
9.	Retail Trade	23,267	1,543	24,810	1,830	26,640	1,543	-3,407	21,403	1,579	-2,803	20,179
10.	Financial, Insurance, and Real Estate	4,016	756	4,772	727	5,499	756	-1,667	3,105	473	-756	2,822
11.	Services	24,492	3,082	27,574	4,151	31,725	3,080	-3,577	23,997	3,612	-2,723	24,886
12.	Federal, Civilian	2,499	-56	2,443	83	2,526	-56	-287	2,156	73	-340	1,889
13.	State and Local	24,087	459	24,546	608	25,154	459	-3,774	20,772	515	-2,880	18,407
14.	Federal, Military	2,910	26	2,936	0	2,936	26	-438	2,498	0	-292	2,206
Proprietorial Employment:												
15.	Farm	3,466	-80	3,386	-79	3,307	-80	-1,248	2,138	-50	-142	1,946
16.	Non-Farm	9,897	638	10,535	958	11,493	638	-1,431	9,104	828	-1,377	8,555
17.	TOTAL	142,093	7,432	149,528	10,139	159,667	10,139	-31,359	120,876	8,829	-18,706	110,999

individual industry employment change for the two periods is proportional to the projected change in the corresponding U.S. industry. The proportional change would amount to an overall change of 7,432 in the 1980-85 period and 10,139 in the 1985-90 period.

In the differential option, industry employment change is partitioned into a proportional effect and a differential effect. The proportional change for each industry is represented by its baseline percentage change for each period. The differential effect is equivalent to the differential change for each industry, that is, the difference in the five-year growth rate between the Northeast Minnesota industry and the corresponding U.S. industry. All industry employment levels under the differential option, except construction, are below the corresponding baseline employment levels. Thus, the differential effect is negative for these industries.

The differential effect for each industry provides a measure of the potential range of employment change in the two five-year periods. For the 1980-85 period, the range of employment change is largest for durable goods manufacturing, retail trade, private services, and state and local government. These four industries have the largest change in the 1985-90 period, also. A major portion of the projected employment decline under the differential option is attributed, therefore, to the negative differential effects in four industry groups.

Industry employment by occupation also is derived for the baseline and the differential options. The detailed occupational breakdown of industry employment is consolidated into nine occupational classes, as shown in Table 4.6. In the baseline option, the largest increases are projected in the service, professional, clerical and managerial occupations. In the (unrevised) differential option, on the other hand,

Table 4.6. Total employed persons in specified occupation by demographic option, Northeast Minnesota, 1980, 1985 and 1990.

Occupation	1980	Projected				Change from 1980			
		1985		1990		1980-85		1980-90	
		Base- line	Differ- ential	Base- line	Differ- ential	Base- line	Differ- ential	Base- line	Differ- ential
		(number)							
Professional	26003	27302	23410	29076	21482	1299	- 2593	3073	- 4521
Managerial	12206	12879	10147	13772	9098	673	- 2059	1566	- 3108
Sales Worker	7888	8586	6400	9121	5918	698	- 1488	1233	- 1970
Clerical	24000	24865	19719	26388	17693	865	- 4281	2388	- 6307
Crafts	16994	17528	15318	18418	13671	534	- 1676	1676	- 3323
Operatives	18290	19050	16337	20006	14414	760	- 1953	1716	- 3876
Non-farm, non-mine	4661	4810	4187	5134	3789	149	- 474	473	- 872
Service	18811	20216	16730	21980	15712	1405	- 2081	3169	- 3099
Farm	2692	2675	2359	2735	2122	- 17	- 333	43	- 570
Total	131544	137911	114607	146630	103899	6367	-16937	15086	-27645

^{1/}Occupational distribution in differential option not adjusted to revised industry employment projections.

the largest decreases are projected in three of the four occupations (the exception being services, which is replaced by crafts as the occupation with the fourth largest employment decline.) For employment and educational counseling purposes, both occupational distributions must be recomputed using a more detailed industry breakdown of the regional economy and a more detailed occupational breakdown of each industry.

Changes in occupational distribution of the employed work force in the 1980's are incorporated into the projected Northeast Minnesota industry staffing patterns in 1990. The projected industry staffing changes are based on industry occupational profiles by the U.S. Bureau of Labor Statistics adjusted to the regional distributions of occupations. Differences between two demographic options for each industry are summarized in Table 4.7. These differences are indicative of the direction and magnitude of changes anticipated in the employed labor force in Northeast Minnesota. Thus, the projected professional employment in the differential option is 3,892 below the baseline option in 1985 and 7,594 below this option in 1990. The overall difference in the two options is 23,304 in 1985 and 42,731 in 1990.

Small Business Development

Small businesses generally are expected to account for 70 percent or more of the net increase in total employment in 1980. In Northeast Minnesota, however, the average size of business is larger than either in the U.S. or Minnesota as a whole. For small businesses to emerge as an equally important source of new employment in Northeast Minnesota, as in the state or nation, private entrepreneurship must achieve an unprecedented position of importance in the regional economy.

Table 4.7. Projected employment difference in specified occupation between differential and baseline options, Northeast Minnesota, 1985 and 1990.

Occupation	1985	1990
Professional	- 3892	- 7594
Managerial	- 2732	- 4674
Sales Worker	- 2186	- 3203
Clerical	- 5146	- 8695
Crafts	- 2210	- 4747
Operatives	- 2713	- 5592
Non-farm, non-mine	- 623	- 1345
Service	- 3486	- 6268
Farm	- 316	- 613
Total	-23304	-42731

Small business development requires a combination of entrepreneurship, production and marketing skills, and venture capital sources, like those currently existing in the Minneapolis-St. Paul Metropolitan Area. While entrepreneurship may be less popular in the region than the state for historical reasons, the educational attainment of the region's population and labor force compares quite favorably with the state. The largest differences occur in the highest levels of educational attainment (because of the concentration of college graduates in the Minneapolis-St. Paul Metropolitan Area).

The educational attainment levels of the existing population and labor force is paralleled by the current high enrollment of persons in public and private schools. However, a lower proportion of the total population is enrolled in institutions of higher learning in Northeast Minnesota than in the state as a whole.

Small business development depends, also, on social investment, that is, public spending on education and health care. Public spending in Northeast Minnesota is above-average in both education and health care. If the below-average enrollment in higher education parallels below-average spending, much above-average support of public schools is implicit in the distribution of the total outlays.

Above-average spending on health care is related, in large part, to the role of health care as a basic industry. Federal and state outlays contribute largely to the above-average total public outlays for health care, particularly in Duluth.

SUMMARY AND CONCLUSIONS

Population, labor force, and industry employment levels in Northeast Minnesota are affected sharply by national economic forces, particularly the business cycle, but, also, the structural changes in the nation's basic industries. This dependence on national market accounts, in large part, for the region's boom-and-bust cycles of industry growth and decline. From 1975 to 1979, for example, the regional economy prospered with the expansion of taconite mining capacity. Employment in construction, as well as taconite mining, increased sharply during this period. Similarly, the large decline in employment and economic activity from 1979 to 1980 is attributed to national economic forces, specifically the 1980 U.S. economic recession.

Total population in Northeast Minnesota increased from 330 thousand in 1970 to 343 thousand in 1980. The largest growth in population occurred in selected urban places, for example, Hibbing and Hermantown in St. Louis County, Cloquet in Carlton County, and International Falls in Koochiching County, and also in selected rural areas in Cook and Itasca Counties. The localization of population growth was due to the localization of economic activity in the seven-county region. Hibbing became a major center of local economic activity related to taconite mining. Hermantown grew because of newly created jobs in the Duluth-Superior Metropolitan Area. Cloquet and International Falls expanded in resident population also as new jobs were created in trade and service, as well as the timber-related, industries.

The 1980 recession quickly turned the economic boom of the 1970's into an economic bust in 1980. In addition to the cyclical downturn,

clear indications of an imminent structural downturn in the U.S. market for Northeast Minnesota taconite pellets were already present by 1980. Since 1980 economic conditions have worsened with increasingly adverse consequences for the resident population and labor force.

Net population effects of cyclical and structural changes are incorporated into two sets of population and employment projections prepared for this report. The population, and related labor force, projections are summarized in Table 5.1 while the employment projections are summarized in Table 5.2. The two sets of projections establish the upper and lower limits of economic activity anticipated in Northeast Minnesota in the 1980's.

The baseline projection is derived from a no-migration, fixed market-share representation of the regional economy. It establishes an upper limit for regional population growth. The alternative scenario is derived from the Northeast Minnesota Regional Economic Impact Forecasting System (REIFS). It represents the lower limit of regional growth and change. The differences in population, labor force and employment, provide rough measures of the task ahead in devising and implementing regional economic strategies for coping with expected reductions in economic activity, particularly in taconite mining.

With no population out-migration as specified in the baseline option, the resident regional population would increase from 343 thousand in 1980 to 355 thousand in 1985 and 367 thousand in 1990. The largest increases would occur in the 25 to 44 year and the under 16 age groups. The 45 to 64 year age group would decline and then remain stable while the 16 to 24 year age group would decline over the entire period. Thus, the resident population becomes an increasingly older population in the baseline option.

TABLE 6.1. Summary Statistics of Population, Labor Force, and Employment (Person Count) by Demographic Option, Northeast Minnesota, 1980, 1985, and 1990.^{1/}

Population Indicator and Gender	Estimated 1980	Baseline		Differential	
		1985	1990	1980	1985
		(thousands)			
Population, total	343	355	367	312	280
Under 16	84	85	90	77	71
16 to 24	57	54	46	40	29
25 to 44	88	102	115	87	83
45 to 64	68	64	64	63	53
65 and over	46	49	51	44	44
Labor force, total	147	156	162	134	117
16 to 24	36	35	30	26	17
25 to 44	64	77	88	66	63
45 to 64	43	39	40	39	33
65 and over	4	4	4	4	3
Employed, total	132	138	147	115	104
Managerial, professional	38	40	43	34	31
Sales, clerical	32	33	36	26	24
Crafts, operatives	35	37	38	32	28
Services, laborers	26	28	30	23	22
Unemployed	15	18	15	19	13

^{1/} Individual entries may not sum to totals because of rounding.

TABLE 6.2. Summary Statistics of Employment (Job Count) in Specified Industries, By Demographic Option, Northeast Minnesota, 1980, 1985, and 1990. ^{1/}

Industry	Estimated 1980 (thousand)	Baseline		Differential	
		1985	1990	1985	1990
Goods-producing, total	37.2	36.9	38.4	32.5	27.9
Agriculture, mining	17.0	16.9	17.3	12.1	9.5
Construction, Manufacturing	20.2	20.0	21.1	20.5	18.3
Services-producing, total	75.4	82.7	90.2	63.3	60.9
Trade, private services	52.7	57.6	63.8	48.9	48.0
Other services ^{2/}	22.7	25.0	26.4	14.4	12.3
Government, total	29.5	29.9	31.0	25.1	22.2
Civilian	26.6	27.0	28.1	22.9	20.3
Military	2.9	2.9	2.9	2.1	1.9
All Industry	142.1	149.5	159.7	120.8	111.0

^{1/} Individual entries may not seem to total because of rounding.

^{2/} Includes all nonfarm proprietorial employment as well as wage and salary employment in: finance, insurance, and real estate; transportation communications, and utilities; and agricultural services.

The differential population option shows a declining total population in all age groups, except the oldest. This option posits much out-migration of both males and females in the 25 to 44 age group. Consequently, the under 16 age group also is expected to drop sharply in the 1980's.

The resident regional labor force and its age distribution is affected by population changes. Labor force participation rates are identical for each age group and gender in the two population scenarios.

In the baseline scenario, the total labor force, 16 years and older, would increase from 147 thousand in 1980 to 156 thousand in 1985, and 162 thousand in 1990. The youngest age would decline most sharply while the 25 to 44 year age group would have the highest rate of increase. New entrants into the labor force would decline, especially in the 1985-1990 period, while retirements would increase, especially in the 1980-1985 period. Thus, involuntary retirements, or population out-migration, would be less with an increasingly older resident population.

In the differential population option, the largest reduction in total labor force is attributed to the 16 to 24 year age group with next largest reduction in the 45 to 64 year age group. The 25 to 44 year age group would remain essentially constant in total numbers.

The employed labor force would increase in the baseline option from 132 thousand in 1980 to 138 thousand in 1985 and 147 thousand in 1990. Unemployment would first increase from 15 thousand to 18 thousand and then drop back to 15 thousand during the 10 year period. Thus, unemployment would remain high -- over 10 percent -- in the entire 10-year period in the baseline option.

The employed labor force in the differential option would drop to

115 thousand in 1985 and 104 thousand in 1990. Unemployment would increase to 19 thousand by 1985 and then decline to 13 thousand by 1990, according to computer simulation results derived for the differential option. The unemployment rate in this option thus would remain above its 1980 level during the entire 10 year period.

The occupational distribution of the employed labor force would expand proportionately in the baseline option. In the differential option, however, every occupation would decline in total number. The managerial and professional group would decline most while the sales and clerical and the crafts and operatives group would decline less. The services and laborers group would decline least. Thus, the out-migration of population and labor force would gradually change its occupational distribution of the regional labor force from its current skill requirements to lesser skill requirements.

The changing occupational distribution of the resident labor force in the differential option is derived from its changing distribution of industry employment, as shown earlier in Table 5.2. Largest reductions in total employment would occur in mining, manufacturing, selected private services, and local government. When compared with the baseline option, however, the largest reductions would occur in other services and indeed, services-producing industries, generally.

Total employment (measured in jobs rather than employed persons) is projected to increase in the baseline option from 142 thousand in 1980 to 149.5 thousand in 1985 and 159.7 thousand in 1990. Implicit in the job-count employment projections is a job-to-employed-persons-ratio of roughly 1.08 to 1; that is, a total of 108 jobs for every 100 employed persons. Goods-producing (non-government) employment would increase in the baseline

option from 37.2 thousand in 1980 to 36.9 thousand in 1985 and 38.4 thousand in 1990. Services-producing (non-government) employment would increase from 75.4 thousand in 1980 to 82.7 thousand in 1985 and 90.2 thousand in 1990. Thus, the ratio of services-producing to goods-producing (non-government) employment would increase from 2.03 in 1980 to 2.24 in 1985 and 2.35 in 1990.

In the differential option the reduction in services-producing employment would be larger than the reduction in goods-producing employment. The ratio of service-producing to goods-producing employment in this option would drop to 1.95 in 1985 and then increase to 2.19 in 1990.

Civilian government employment, largely local government, is projected to increase in the baseline option from 26.6 thousand in 1980 to 29.9 thousand in 1985 and 31 thousand in 1990. In the differential option projections, civilian government employment drops to 25.1 thousand in 1985 and 22.2 thousand in 1990. The large drop in local government employment is consistent with the large projected drop in total population and local government revenues, particularly from the taconite production tax.

The 16-industry breakdown of the regional economy, and the 9-occupation breakdown of each industry must be expanded if the findings are to be useful in employment and educational counseling. Computer programming resources were lacking to complete this essential step. The limited findings nonetheless show the range of potential adjustments in Northeast Minnesota population, labor force, and employment as the regional economy is confronted by both cyclical structural changes in domestic markets, particularly for its taconite mining and selected manufacturing industries.

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